No. 694,757. Patented Mar. 4, 1902.

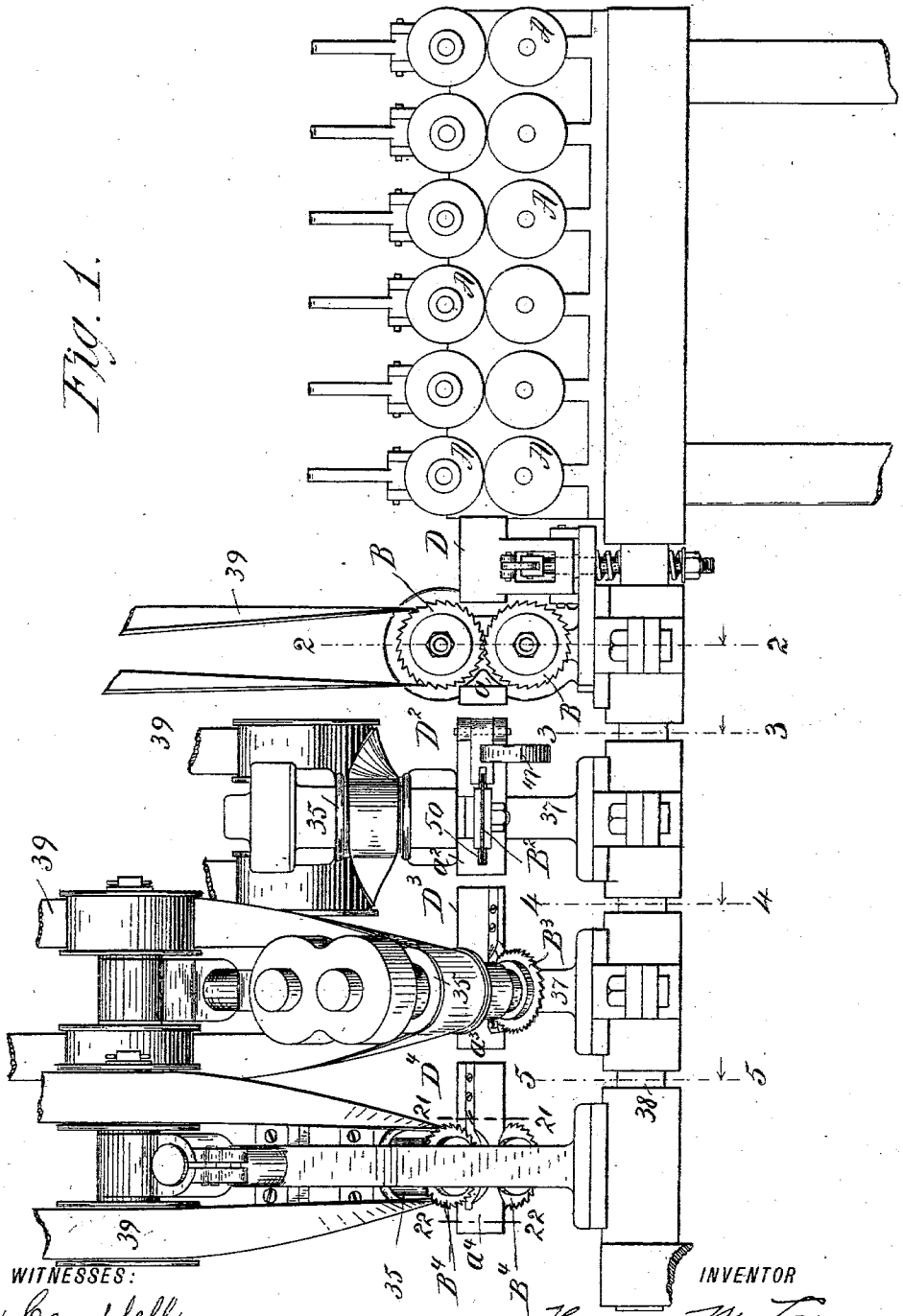
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MACHINE FOR DIVIDING RATAN.

(Application filed Aug. 2, 1899.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

Fig. 2.

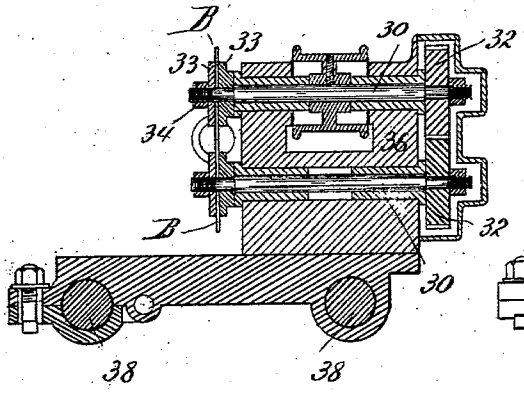


Fig. 3.

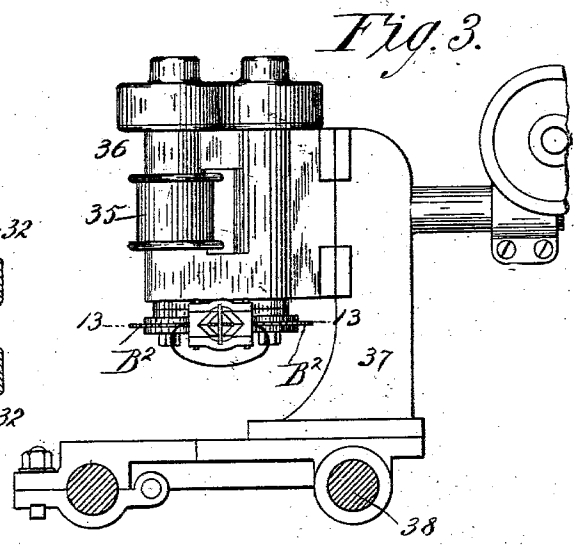


Fig. 4.

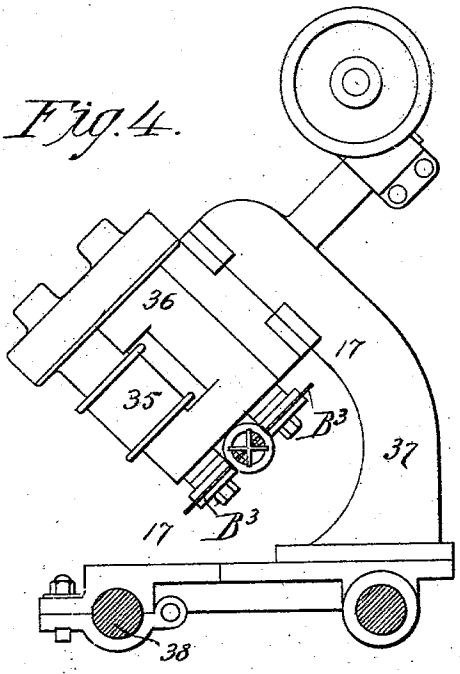
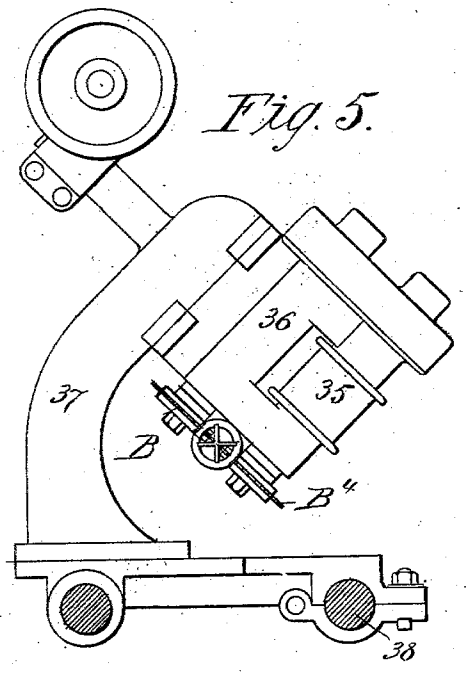


Fig. 5.



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(No Model.) 4 Sheets—Sheet 3.

Fig. 6.

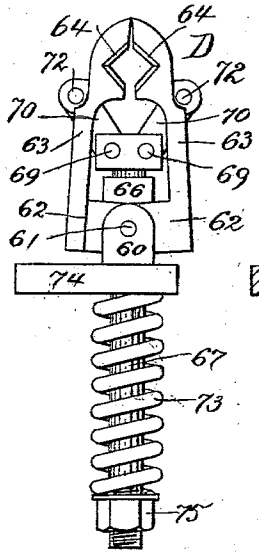


Fig. 7.

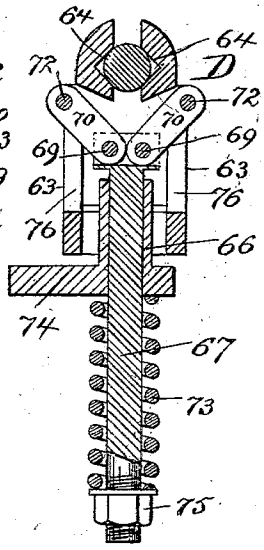


Fig. 8

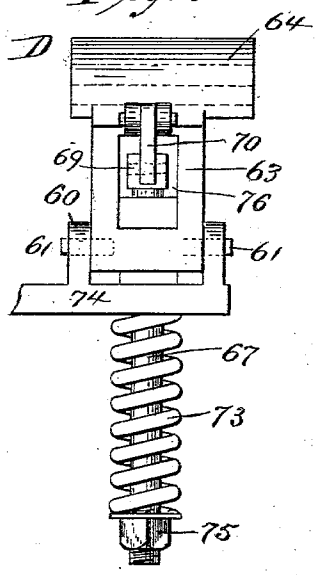


Fig. 9.

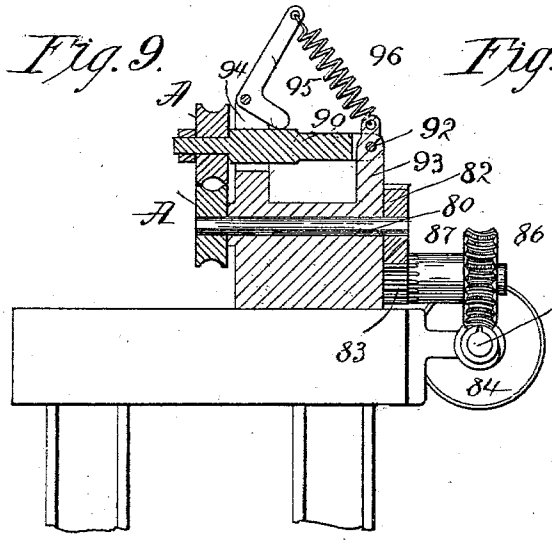
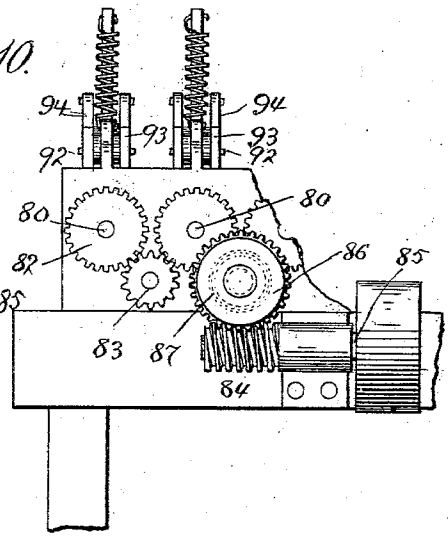


Fig. 10.



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Fig. 11.

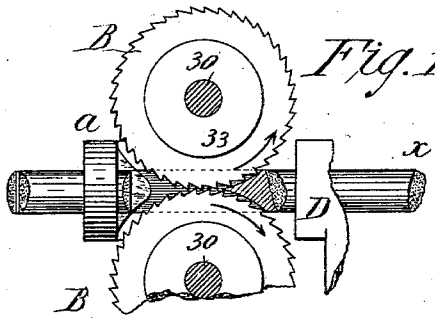


Fig. 12.

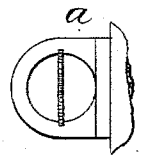


Fig. 13.

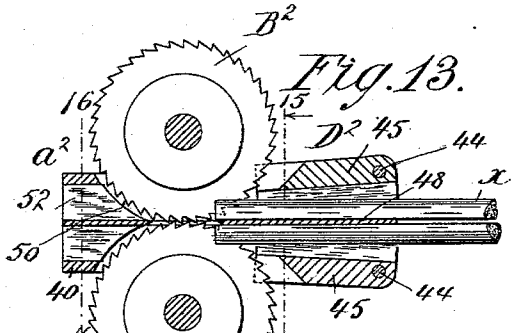


Fig. 14.

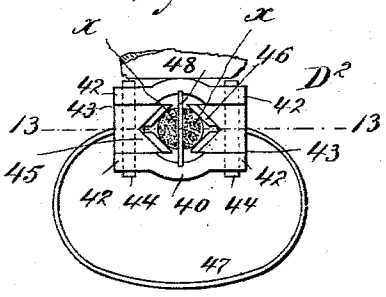


Fig. 16.

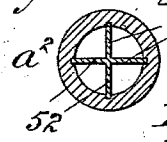


Fig. 15.

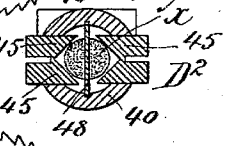


Fig. 18.

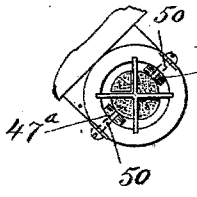


Fig. 19.

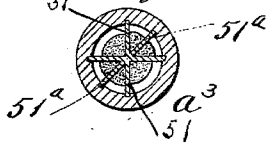


Fig. 17.

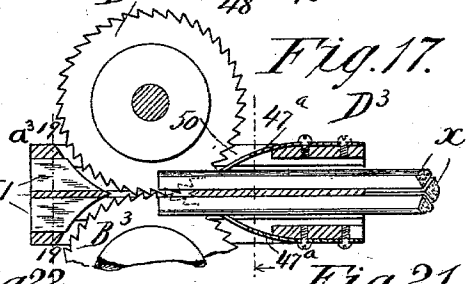


Fig. 22.

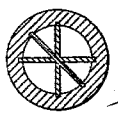


Fig. 21.

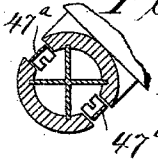


Fig. 20.

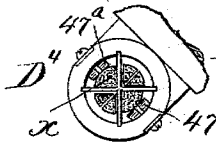
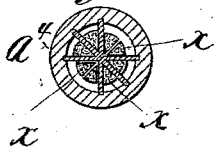


Fig. 23.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR DIVIDING RATAN.

SPECIFICATION forming part of Letters Patent No. 694,757, dated March 4, 1902.

Application filed August 2, 1899. Serial No. 725,934. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. LARSSON, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Machines for Longitudinally Dividing or Stripping Ratan, Wood, or other Stock, of which the following is a full, clear, and exact description.

This invention relates to improvements in machines for producing from lengths of ratan, wood, bamboo, or the like, round in cross-section and of uniform or unequal diameter, several strips or segments, which may be utilized for various purposes, as in the make-up of stocks, cores, or bodies of whips, fancy or ornamental billiard-cues, or fish-rods.

The objects of the invention are to provide a machine of the character indicated which shall be entirely successful in the performance of its work, especially as regards the true formation of the segmental strips and the proper guidance thereof, comparatively rapid in operation, and of extremely simple, stable, and durable construction.

Another object of the invention is to especially adapt the circular saws employed in the machine to the operation of stripping the ratan or like woody stock into longitudinal segments by having the saw-teeth in their circular courses to take and work upon internal portions of the ratan in advance of their reaching the scale-covered exterior, whereby the ratan is not only more cleanly and evenly sawed, but whereby also the destructive action of the glaze or enamel-like scale upon the teeth of the saws is avoided.

The invention consists in a machine embodying in its organization constructions and combinations of parts, all substantially as hereinafter described, and set forth in the claims.

In the machine which I have designed and constructed and which is illustrated in the accompanying drawings appliances are comprised for the production from a length of ratan of eight longitudinal divisions or sections thereof, each of which cross-sectionally is in the form of a true segment of a circle, the convergent sides of the segment being coincident with planes of the sawing.

This machine comprises the series of paired feeding-rolls, having uniformly feeding motions to push or forcibly move the length of ratan endwise to the action of the several pairs of circular saws, which are arranged in succession, each pair in a plane angular to that of another pair, there being located in advance of the first pair of saws a guide for insuring that the forward end of the ratan strip as a whole will be guided centrally in relation to the saws and in advance of each succeeding pair of the saws, guides to insure that the divisional parts of the stock to be further divided will be presented with their truly central radial lines coincident with the saws which are to operate upon them, and the machine further comprises following one set of saws and in respect of the aforementioned guides in advance of the next set of saws separating walls, webs, or blades operating to insure the divisions of the stock as they may have already been produced (and which have still further to be halved) to enter the succeeding centering-guides with certainty and without any liability of having their ends strike the ends of the centering-guides, which would cause a crippling action and defeat the operations of the machine, and the saws have beyond them, in the direction of feed of the stock and to act in conjunction therewith, spreaders for the divided strips as being produced by such saws for relieving any binding action by the strips upon the saws.

In the drawings, Figure 1 is a side view of my improved machine, the feed-rolls being seen at the right and the stripping-saws and cooperating devices being seen at the left. Fig. 2 is a vertical sectional view transversely of the machine as taken on the plane indicated by the line 2 2—that is, through the first set of saws and the head in which they are mounted and the driving means therefor. Fig. 3 is a view beyond the plane indicated by line 3 3, Fig. 1, as seen in the direction of the arrow, showing the second set of saws and the head in which they are mounted and driven. Fig. 4 is a similar view as seen be-

yond the plane indicated by line 4 4, Fig. 1, showing the head and the oblique arrangement of the third set of the saws. Fig. 5 is similarly a view as seen beyond line 4 4, Fig. 1, of the head and saws of the fourth set, showing the reversed oblique arrangement thereof. Fig. 6 is a view at the forward end of the centering guide or chuck through which the unsawed strip is passed and guided before being brought to the cutting action of the halving-saws. Fig. 7 is a vertical section transversely of said centering guide or chuck, and Fig. 8 is a front elevation of the same. Fig. 9 is a cross-sectional view through one pair of the series of paired feed-rolls, showing the driving means therefor. Fig. 10 is an elevation, as seen at the side opposite Fig. 1, of a part of the feeding mechanism, inclusive of the driving-gearing therefor. Fig. 11 is a view facewise of the first pair or halving-saws and the length of round ratan being fed subject to the action thereof, the centering-guide at the rear and the spreader in advance of the said saws being shown, and a portion of the length of ratan is broken away and in section for clearer illustration. Fig. 12 is an end view of the spreader, which is seen at the left of the saws in Fig. 11. Fig. 13 is a horizontal sectional view as taken substantially on the plane indicated by the line 13 13, Fig. 3, and drawn on a larger scale. Fig. 14 is a view of the centering-guide as seen at the left of Fig. 13 and as seen in Fig. 3, showing, however, the cross-section of the already-halved ratan in its passage therethrough and to the second set of saws, which quarter it. Fig. 15 is a cross-sectional view on line 15 15, Fig. 13. Fig. 16 is a cross-sectional view on line 16 16, Fig. 13. Fig. 17 is a sectional view on substantially the line 17 17, Fig. 4, on the plane of the third pair of stripping-saws and through the guiding appliances combined therewith. Fig. 18 is a view as seen at the right-hand end of Fig. 17. Fig. 19 is a cross-sectional view on line 19 19, Fig. 17. Fig. 20 is an end view of the guiding appliance which is shown in conjunction with the fourth set of saws at the extreme left of Fig. 1 and the same as seen in Fig. 5, but drawn on a larger scale and showing in cross-section the ratan which is being subjected to the fourth sawing operation. Fig. 21 is a cross-section of the last-named guide as taken substantially on the line 21 21, Fig. 1. Fig. 22 is a similar section, but taken on the line 22 22, Fig. 1. Fig. 23 is a section like Fig. 22, but showing in conjunction therewith the cross-section of the ratan in the condition in which it is finally delivered through the last guide.

Similar characters of reference indicate corresponding parts in all of the views.

In the drawings, A A represent the series of paired rolls for feeding the round ratan or other stock to the action successively thereon of the halving-saws B B to the saws B^2 B^2, arranged at right angles to the halving-saws for centrally dividing both said halves, to the saws B^3 B^3, arranged at an angle of forty-five degrees to the quartering-saws B^2, and then to the fourth set of saws B^4, arranged in a plane at right angles to the ones B^2, the saws B^3 subdividing two of the quarters, producing the segmental eighths, while the last saws B^4 similarly subdivide the other two quarters. Each pair of circular saws is mounted on the end of a shaft 30 therefor, the teeth of the saws, as indicated in Figs. 11, 13, and 17, intermeshing or matching into the spaces between the teeth of its companion, although not quite touching the teeth of the companion saw, and both of the saws are positively driven to rotate in opposite directions by the meshing gear-wheels 32 on the ends of the parallel saw-carrying shafts 30. The saws are clamped between collars 33 and secured by nuts 34, and one of the saw-carrying shafts, which is geared to the other, as aforesaid, is driven by the pulley 35. The four sets of saws are mounted in journal bearings or heads 36 therefor, carried by standards or supports 37, all mounted on the parallel longitudinal bars 38 of the machine-frame and have their intermeshing points all in the same common line of feed of the stock.

The pulleys 35 for the respective saw-shafts are each driven by the respectively provided belt 39, all of which belts are driven from a common counter-shaft pulley or suitably otherwise.

The comparatively long series of feed-rolls A A force and lead the ratan or other stock to the equalizing centering-guide D, arranged in relation to the first pair of halving-saws, so that the stock will be truly presented with its longitudinal median plane coincident with the cutting plane of the said saws.

Beyond the halving-saws and before the quartering-saws are reached is the guide D^2, whereby the halves as produced by the first saws will each be guided so that the central radial line thereof will come coincident with the cutting plane of the quartering-saws B^2, and between the first saws B and the guide D^2, adjacent the quartering-saws B^2, is a separating-guide a, the principal object of which is to insure that the forward ends of the halves of the stock will enter properly within the guiding spaces or passage therefor within the device D^2.

The separator-guide for the halves a is shown in Figs. 1, 2, 11, and 12, and the centering-guide for such halves is shown in Figs. 1, 13, 14, and 15, and next following the pair of quartering-saws B^2 are separator-guides, (indicated and shown at a^2 in Figs. 1, 13, and 16.)

The centering-guide D^2, preceding the quartering-saws, and the separator-guide a^2, following the quartering-saws, as indicated in Figs. 13, 14, and 15, are constructed in one fixture, although they need not necessarily be so constructed. This fixture comprises a tubular body 40, having in its end portion pre-

ceding the saws the widened walls, as indicated at 42, constructed with the apertures 43 in opposite sides, pivoted at 44, in which are the movable guide blocks or members 45 45, each having its inner edge of V form, as indicated at 46. These are pressed inwardly by the spring 47. Between the members 45 45 is the vertical central partition 48, the plane of which is at right angles to that of the quartering-saws. This tubular fixture is intermediately slotted, as indicated at 50, from opposite sides to leave entrance-spaces for the intermeshing edge portions of the saws, the slots 50 from the opposite sides merging into each other, and the said fixture has in its end portion in the line of feed of the stock beyond the quartering-saws its circular passage divided into quarter-spaces by the radial and right-angularly intersecting partition-walls 52, as shown in Fig. 16.

Following the quartering-saws B^2 in the line of feed is the guide D^3 for the now produced quarters, carrying them to the third pair of saws B^3, the same comprising centering appliances for the diametrically opposite two of the quarters, the whole being constructed in the form of a tubular fixture following in construction and purpose similar ideas as embodied in the device shown in Fig. 13; but in this device there are the quarter partitions, making four guiding-chambers, as seen in Fig. 18, in two of which are centering-springs 47^a, so that the two quarter-segments will be truly presented radially in relation to the third pair of saws, which cut those two quarters into eighths, and then following the saws B^3 in the line of feed of the stock the tubular separating-guide a^3, as seen in Figs. 17 and 19, has its passage partitioned by the walls 51 as a counterpart D^3 or continuation of the partitions seen in Fig. 18, the preceding guide with the additional walls 51^a, which separate the eighth segments as produced by the said saws B^3. The guide D^4 next preceding the last pair of saws B^4 is partitioned by radial walls and for the formation of separate longitudinally-extending passages corresponding to and as continuations of separator-guides (seen in Fig. 19) which follow the third set of saws, such separator-guides assuring that those segments so far as produced and which have further to be subdivided when brought through them will enter separate V-shaped guide-passages, respectively, therefor in the device D^4, and this device is in many respects similar to the one shown in Fig. 17 in longitudinal section, differing therefrom in that the saw-openings and lateral pressure-springs are arranged diametrically opposite, as will be perceived on viewing Fig. 21 in comparison with Fig. 18.

The centering or equalizing guide D for the whole ratan and the centering-guide D^2 for insuring truly radially and centrally the presentation of the halves to the quartering-saws have or comprise opposite jaws, between which the stock is passed, which jaws have the V-recesses on their inner sides, and the pressure device for insuring the transverse pressure on the jaws of the equalizing-guide D is somewhat different from the springs which press inwardly both the members 45 of the device D^2—that is to say, on reference to Figs. 6, 7, and 8, as follows: Upstanding from the framing or stationary support for the device D are the opposite ear-pieces 60 60, pivoted in which, at 61, are the inwardly-extending members 62 of the opposite jaws 63 63, the upper ends of which have the inwardly-facing V-recesses 64.

Centrally between the jaws 63 63, playing through a vertical guiding-socket 66 therefor, which is formed in a stationary part or fixture of the frame, is the shaft or stem 67, having pivoted to the upper end thereof at the points 69 69 the upwardly and outwardly divergent links 70, which are also pivoted at 72 to the jaws 63. The spring 73 exerts a downward force on the stem by being constrained between the stationary part 74 and the nut or shoulder 75 and serves to cause through the articulation of the parts of the device, as described, a closing pressure of the one jaw on the other. As the stock is introduced and fed through and between said pressure-jaws of this equalizing-guide it is carried or maintained with its center always in the same line, notwithstanding undulations or irregularities in its diameter, for the jaws must open and will close toward each other always exactly equally.

As shown in Figs. 7 and 8, the shanks or lower portions of the opposite jaws are apertured, as shown at 76, to give unobstructed space of occupancy for the links 70, so that the device may be very compact in its organization.

Describing the construction and manner of driving the feeding-rolls A A, reference is now had to Figs. 9 and 10, the latter being a rear view as taken from the side opposite Fig. 1. All of the lower rolls of the series are mounted at the forward ends of the shaft 80, each having thereon the gear-wheel 82, one of these being driven from another by the idlers 83. The worm 84 on the pulley-driven shaft 85 drives the worm-wheel 86, which has on its elongated hub the spur gear-wheel 87, which meshes into two of the separated gear-wheels 82 of the set. Each of the upper feed-rolls or feed-wheels, which, it is understood, is essentially a pressure-roller and has its rotary motion imparted thereto by the stock as positively fed by the positively-driven lower rollers, has its journal-bar 90, by the rear end thereof, pivoted, as seen at 92, in a lug or fixture 93 of the frame of the machine. Near the forward end of the shaft, but behind the feed-wheels, are also lugs or stationary fixtures 94, in which the elbow-levers 95 are at their elbows pivoted, the short arm of the lever bearing with pressure downwardly against the bar 90, which pressure is imparted by the spring 96, which by its one

end is hung to the long arm of the elbow-lever and with its other arm to the lug or part or fixture of the framing therefor. When the ratan is introduced between the feed-rollers, the upper one is separated against the pressure of the spring as exerted through its force on the elbow-lever thereon. The rollers are formed with hollowed or peripherally-grooved rims and, furthermore, with serrations in the grooves to increase their certainty of feeding action; but such construction of the rolls involves in itself no invention.

It will be perceived on reference to Figs. 11 and 13 that as the stock is fed the teeth of the intermeshing saws as they successively approach the stock for the sawing action thereon work from the interior thereof outwardly toward the opposite surfaces, and because of this manner of sawing and because in practice the scale or glaze at the exterior becomes cleft or split on the sawing-line slightly before the teeth of the saw actually reach the exterior of the stock the saws are saved from the destructive action thereupon which would ensue in an operation where the saws cut entirely through the stock, as ordinarily practiced, wherein is necessitated the striking of the glaze directly by the saw-teeth.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine of the character described, a pair of subdividing-saws for halving sections of stock already longitudinally divided, having coöperating therewith centering-guides for the divisions to be further divided, and having following the saws, separating-guides for those divisions of the stock produced and brought thereto which are to be further halved, in combination with a still further pair of saws located in the line of feed of stock beyond the first pair of saws for subdividing pairs of the segmental stock strips having preceding them guides with passages for the segmental sections to be further halved, into which guides such strips are all led by the said separating-guides next preceding them, substantially as described.

2. In a machine of the character described, the combination of the feed-rolls A A, the several pairs of circular saws, each pair having succeeding points of location in the line of feed of the stock and each pair arranged in a plane angular to that of another pair of the saws, and all having the approaching edges thereof working in the common line of feed of the stock, centering-guides for the undivided stock, preceding each pair of the saws, separator-guides following all the saws but the last for insuring the entrance separately of the divisions to be further divided into the guides preceding the respective subdividing-saws therefor.

3. In a machine of the character described, halving-cutters, a pair of circular saws in edgewise proximity working in a plane right-angular to the halving-cutters, for quartering, a pair of saws for subdividing diametrically opposite quarters of the stock, arranged in a plane angular to both that of the halving-cutters and the quartering-saws, and a still further pair of saws for subdividing the two remaining quarters of the stock, arranged in a plane at right angles to the preceding subdividing-saws, means for guiding the stock and the divisions and subdivisions, with their central radial lines coincident with the cutters or saws therefor, and means succeeding each of the cutters or saws excepting the last, for separating or spreading the divisions of the stock, then being led or fed to the succeeding guides so that they will enter the respective succeeding guide therefor to be properly individually presented to the cutter for the further division thereof.

4. In a machine of the character described, in combination, halving-cutters and guides for leading the stock thereto, quartering-saws located in the line of feed beyond the halving-cutters and guides for leading the halved stock centrally to said quartering-saws, and a pair of saws having a location in the line of feed beyond the quartering-saws arranged in a plane angularly thereto, guides having V-walls for leading opposite quarters of strips centrally to the last-named saws, sidewise pressure appliances, and devices for separating the ends of the strips being fed and approaching said endwise open V-guides, whereby such will be brought into such guides, substantially as described.

5. In a machine of the character described, the combination with mechanism for longitudinally feeding segmental strips, and subdividing-cutters to which the strips are fed, guides adjacent the cutters having V-formed walls, appliances acting with lateral pressure for yieldingly forcing the segmental strips to contact on the convergent walls of the guides, and means for insuring the separation of the forward ends of the strips being fed to the guides and cutters, whereby they will respectively enter the individual guides therefor.

6. In a machine of the character described, the combination with mechanism for longitudinally feeding segmental strips, guides for such strips which transversely are of V form and appliances acting with lateral pressure for yieldingly forcing the segmental strips to contact on the convergent walls of the guides, and subdividing-cutters for the segments fed thereto through said adjacent guides.

7. In a stock-stripping machine, the combination with the halving-cutters, of the separator-guide following same, a pair of quartering-saws B^2 B^2, guides for the halves preceding the saws comprising a median wall at right angles to the saws, and the laterally-arranged members 45 having V-recesses at their inner sides, and an inwardly-pressing spring for each said member.

8. In a machine of the character described, the combination with a halving-cutter, of a guide, and means for feeding and guiding the

ratan or similar stock to and past the action of the same, of a succeeding saw or saws operating in a plane at right angles to the first saw, centrally-partitioned, longitudinally-arranged guides, and transverse pressure appliances whereby the half-strips are carried centrally coincident with the second sawing plane, a longitudinal strip-separating wall succeeding the first cutter and between same and the guides in advance of the second saw or cutter for insuring the entrance of the halves respectively into the individual guides therefor, leading them to the second cutter, substantially as described.

9. In a machine of the character described, the combination with the quartering-saws B^2 B^2, and the separator-guides following them, having four radial partition-wings between which the quarter-segments pass in separation, of the pair of saws B^3 B^3 arranged in a plane radially intersecting a pair of the quarter-segments, a guide having four V-shaped passages preceding said saws, and pressure-springs transversely acting inwardly within an opposite pair of said V-passages, substantially as and for the purposes set forth.

10. In a machine of the character described, the combination with the set of saws B^3 B^3 arranged as described, coöperating with and following which is the separator-guide device having diametrically opposite wall-separated passages for undivided quarter-segments, of the pair of saws B^4 B^4 right-angular to the saws B^3 B^3, and centering-guides preceding them, but following the aforesaid separator-guides, which follows said saws B^3, substantially as and for the purposes set forth.

11. The set of feed-rolls A and the means for driving them all in unison, the four pairs of saws, the first and second arranged right-angular to each other, and the third and fourth arranged right-angular to each other, but both angular to the first and second, and all having their working edges intermeshing at a common longitudinal line, and guides for carrying stock centrally to the first pair of saws, and divisions thereof in radial coincidence with the succeeding sets of saws, for the purpose set forth.

12. In a stock-stripping machine, the combination of two or more sets or pairs of saws arranged with their teeth intermeshing and the saws of one pair in a plane angular to that of another pair, means for rotating both saws of each pair in opposite directions at the same speed, and means for guiding round stock in radial coincidence with the cutting planes of said saws.

13. In a machine for stripping ratan or other stock, a pair of circular saws both arranged for rotation in a common plane with their teeth intermeshing, means for rotating the saws in opposite directions at exactly the same speed.

14. In a machine for stripping ratan or other stock, a pair of circular saws both arranged for rotation in the same plane with their teeth intermeshing, means for rotating the saws in opposite directions at exactly the same speed, and a guide preceding said pair of saws.

15. In a machine for stripping ratan or other stock, a pair of circular saws both arranged for rotation in the same plane with their teeth intermeshing, means for rotating the saws in opposite directions at exactly the same speed, and a centering-guide preceding said pair of saws, and a separator-guide following same.

16. The combination of feed-rolls A A, and means for running them all in same direction, pairs of saws B, B^2, B^3, B^4, those of one pair being angular to those of another, and having the toothed edges intermeshing, the centering-guide D, preceding saw B which cuts the whole stock, the centering-guide D^2 preceding the quartering-saws B^2 for centering the halves relatively to such saws, centering-guides D^3 D^4 insuring the presentation of the diametrically opposite pairs of the quarters radially centrally relatively to the third and fourth pairs of saws, respectively, and separator-guides preceding the centering-guide for all the saws which follow the first set thereof, substantially as described.

17. The series of feed-rolls consisting of positively-driven lower rolls and upper pressure-rolls, bars on which the upper rolls are journaled, standards to which end portions of the said bars are pivoted, levers pivotally mounted and having a member thereof in pressure bearing on the respectively adjacent bar, and a spring applied to and exerting a draft force on the other member of each said pivoted lever, substantially as described.

18. In a stock-stripping machine, the combination with a tubular guide device having segmental-shaped openings therethrough, and having slots leading from opposite sides through the wall of the tubular device and entering opposite ones of said segmental openings, of the pair of circular saws having their teeth in intermeshing relations as described, and oppositely entering through said slots, means for driving the same and transverse pressure appliances inwardly acting within the segmental openings in which said saws enter.

19. The combination with a guide for cross-sectionally segmental strips of ratan or other stock comprising a V-shaped guiding-passage, of a subdividing circular saw arranged in a plane intersecting the guiding-passage and adapted to rotate so that its teeth move from the inner toward the outer side of the strip, and means for rotating said circular saw.

20. The combination with a guide for segmental strips of ratan or other stock comprising a V-shaped guiding-passage, of a subdividing circular saw arranged in a plane coincident with a line radially extending from the apex of and intersecting the guiding-passage and adapted to rotate so that its teeth move from the apex outwardly, and means for rotating said circular saw in the stated direction.

21. In a machine of the character described, in combination the four pairs of saws, the first and second pairs arranged in planes right-angular to each other, and the third and fourth pairs arranged right-angular to each, and both angular to the planes of the first and second pairs and all having their working edges intermeshing at a common longitudinal line, and guides for carrying the stalk centrally to the first pair of saws, and divisions thereof, in radial coincidence with the succeeding pairs of saws, substantially as described.

22. A pair of arbors having intermeshing gears and also having circular saws, the teeth of which intermesh, and means for causing the rotations thereof.

HENRY W. LARSSON.

Witnesses:
WM. S. BELLOWS,
M. A. CAMPBELL.